**Beetham Wastewater Treatment Plant**  
**Trinidad**

**Location**   
Beetham, Port of Spain, Trinidad

**Project Type:**Turnkey

**Scope of Works:**   
Turnkey Construction of the 180 Mld New Beetham (ASP) Wastewater Treatment Works.

**Start Date:**November 2001

**Raw Effluent:**   
BOD load 16,260 kg/d  
Suspended solid 211 mg/l

**Final Effluent Required:**   
BOD 20mg/l

**Average Flow:**   
75 Mld

**Peak Flow:**   
180 Mld

**Project Duration:**   
36 months

Due to increased economic development, population growth and increasing levels of tourism, Trinidad and Tobago’s national Water Supply and Sewerage Company (WASA), recognised that a new treatment plant was required to meet stringent environmental standards.

To protect as much of the wetlands as possible existing reclaimed land has been used for the temporary site offices and storage yards to reduce the extent of mangrove clearance. The existing pumping station has been refurbished rather than construct a new facility, which has both environmental and economic benefits. Construction of the ground works, which began in 2001, had to be carried out carefully as the facility is built on a mangrove swamp.

The New Beetham Plant has been designed to withstand “Zone 3” earthquakes, as well as the weight of heavy mobile construction equipment. Extensive lateral and seismic testing on the load bearing capacity of the site, as well as the load bearing capacity of the piles supporting the plant, had to be undertaken. The result is a uniform fill of two metres across the whole site area penetrated by over 2000 piles, with an average length of 25 metres, driven into the ground to meet the necessary earthquake zone requirements

**Main Items of Plant:**

* Preliminary treatment step screens and vortex grit removal
* Secondary aerobic treatment two Bioreactors complete with front-end anoxic zones and mechanical surface aerators four Final Clarifiers (39m diameter)
* UV system - disinfection of final effluent
* Feed, transfer, recirculation and discharge pumping and pipework
* Site water systems - process wash water and fire system
* Power supplies including substations, switchgear, cabling and emergency generator
* Complete control and monitoring system (MCCs, SCADA, instrumentation)
* All operations and control buildings including fully equipped on-site laboratory

[**http://www.biwater.com/casestudies/detail.aspx?id=26**](http://www.biwater.com/casestudies/detail.aspx?id=26)

Trinidad and Tobago project designed to protect Buccoo Reef

PETER KENTER

correspondent

Canadian experience in water and wastewater engineering is portable. The engineers at IBI-MAAK Inc. of Richmond Hill, Ont. have feet planted firmly in Canada and on the island nation of Trinidad and Tobago.

The company has worked on consulting contracts for the Lake Simcoe Water Pollution Control Plant, the Region of York north wastewater upgrades, the Casino Rama water treatment and sewage treatment plants and the Orillia Water Filtration Plant.

In Trinidad and Tobago, IBI-MAAK has designed supervisory control and data acquisition (SCADA) systems for the entire Trinidad and Tobago water system.

The company is currently involved in a design/build contract to develop the new Matura Water Plant to treat raw water from the Matura River in the eastern part of Trinidad. The plant is designed to add 31.5 million litres of fresh water to the system operated by the country’s Water and Sewerage Authority (WASA).

It’s also finalizing plans for the Crown Point Wastewater Treatment Plant (CPWT) to treat effluent in Southwest Tobago.

“We’ve been working in the Caribbean since 1996,” says Marius Caprariu, manager, water and wastewater with IBI-MAAK.

The company maintains a site office in Trinidad where Caprariu spends about a week out of every month.

The islands boast huge natural gas reserves and the country is investing more heavily in infrastructure to spur additional development.

Both plants are part of that expansion program.

“We often partner with other companies in bidding on these projects,” says Caprariu. “We’ve worked with Canadian engineers Marshall Macklin Monaghan, Metcalf & Eddy, Inc. in the U.S. and with consulting engineers from Trinidad as well.”

Crown Point is part of the country’s oldest tourist area, with the environmentally sensitive Buccoo Reef located near the current sewer outfall.

“It’s one of the nicest reefs in the world,” says Caprariu. “If a lot of nutrients are discharged into those waters, the algae that results can overtake the reef.”

The system is designed to serve 40,000 of the island’s 60,000 residents, many of whom are served by septic tanks.

“The tanks are serviced by honey truck wagons which transport the sludge to the landfills for disposal,” says Caprariu. “Part of the project involves convincing people that it’s in their best interests to connect to the new sewer system.”

IBI-MAAK divided the region into seven catchment areas to collect and drain wastewater by gravity to a natural low point and then pump it to a main trunk sewer, which transports the wastewater to the CPWT.

The final design of the $32-million plant depends on who will be funding construction.

The Caribbean Development Bank (CDB) and the Inter-American Development Bank (IDB) had agreed to fund a sewage treatment plant offering secondary treatment, while the federal government has expressed interest in funding a more advanced design involving tertiary treatment.

“With tertiary treatment, the effluent can be reused for irrigation at local golf courses, or as cooling water for a hydro generating plant powered by natural gas,” says Caprariu. “Any unused effluent can be discharged into the ocean through an outfall line over one kilometre long.”

A change in governments, however, has held up a final decision on the degree to which effluent will be treated, until negotiations with the CDB and IDB are re-opened.

“It’s currently a moving target,” says Caprariu. “But the collection system and secondary treatment system are going ahead with conventional activated sludge treatment, UV disinfection and bio-solids management. Later, if the requirements for reuse are still on the table, the wastewater treatment plant would be upgraded by adding either a membrane biological reactor or tertiary filtration.”

IBI-MAAK will pursue the other remaining phases of the projects, such as construction supervision and commissioning, as terms of reference are announced.

The company is also involved in retrofitting an existing wastewater treatment plant in Scarborough, Tobago’s largest city, to the same standards as the Crown Point plant.

Next up on the islands, IBI-MAAK is formulating a design/build bid with Clearway Construction of Concord, Ont.

The job is to nearly double the transmission capacity of Trinidad’s Point Lisas desalination plant to more than 250 million litres per day.

“There will be stiff competition, with bids from countries including China, Venezuela, and Spain,” says Caprariu.

“But we’re familiar with the market. We’re up for it.”

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